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A "VIRUS" DISEASE OF CHINOOK SALMON

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INTRODUCTION

Epizootics among chinook salmon fingerlings at the Coleman National Fish Hatchery have occurred periodically since 1941. A virus or virus-like filterable agent has been demonstrated to be the causative agent of this disease.

IDENTIFICATION

The disease becomes manifest shortly after the fish begin feeding. Externally the fish appear dark in color, and may swim with a rolling motion. An exophthalmic condition is prevalent, and numerous affected fish display a distinct hemorrhagic zone on the dorsal region posterior to the head. There is a tendency for hemorrhagic areas to develop at the base of the pelvic fins, and on the opercula, isthmus, and eye. Internal symptoms are characterized by an anemic condition as indicated by pale gills, heart and liver. The stomach is usually white and empty and the intestinal tract may contain a white or light yellow colored fluid.

Stained sections of the liver, kidney, and pancreatic tissue show necrotic changes with cytoplasmic and nuclear inclusions of various sizes present in the affected tissues.

CAUSE OF DISEASE

The etiologic agent of the disease is believed to be a virus or virus-like entity. It will pass through at least two types of bacteria-proof filters, i.e., Millipore and Mandler. Antibiotics and sulfonamides have not been effective in controlling the epizootics.

SOURCE AND RESERVOIR OF INFECTION

Indirect evidence suggests the water supply as the origin of the infection, however, other sources have not been entirely excluded.

MODE OF TRANSMISSION

Under experimental conditions it has been possible to reproduce the disease either by inoculation of infected filtrates or by direct exposure of healthy fish to infected fish.

INCUBATION PERIOD

Laboratory infected chinook fingerlings suffered mortalities three days following inoculation. Healthy chinook fingerlings began to die 12 days following direct exposure to infected fish.

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PERIOD OF COMMUNICABILITY

Epizootics occur as water temperatures approach 45°F. during the early spring months shortly after the fingerlings have begun to feed. As the water temperature rises to 50°F. and above, the mortalities decrease. At this time, however, the fish are also larger in size, which may prove to be a factor of increasing resistance.

SUSCEPTIBILITY AND RESISTANCE

The disease has occurred only in chinook salmon (Oncorhynchus tshawytscha), although silver salmon (O. kisutch), rainbow and steelhead trout (Salmo gairdneri), and Kamloops trout (S. gairdneri Kamloops) are being reared at this station. Sockeye salmon fingerlings (O. nerka), injected with bacteria-free filtrates prepared from infected chinook tissues, have on occasion exhibited typical gross symptoms of the Coleman disease.

RANGE

At present this disease has been recognized only at the Coleman, California, National Fish Hatchery.

OCCURRENCE

At water temperatures below 50°F. when the fish begin feeding.

METHOD OF CONTROL

While no methods of control are presently available, one possible preventive measure has been suggested. This would provide for delaying the hatching of eggs through the use of water at lower temperatures than previously used. Thus, the eggs could hatch at a time when normal water temperatures approached 50°F.

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